

A Descriptive Study of Turkish University Students' Awareness of Ergonomic Computer Usage

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Abstract: Although computers have many benefits for people, long-term continuous and non-ergonomic usage may lead to a number of health problems, especially vision and posture disorders. Therefore, it is crucial for students to learn and implement ergonomic usage principals. Perhaps, university students are the most at risk users as their access to computer technologies increase due to various technological facilities offered by universities as well as increased free time uncontrolled by parents or relatives. This study aims to explore university students' awareness level of ergonomic computer use. It was designed as a descriptive survey research on a sample of 144 university students attending at a major southwestern university in Turkey. Data were collected through the questionnaire form measuring some demographic characteristics and knowledge about the healthy use of computers. The findings revealed that participating students spent an average of almost two and half hours daily for computer use and most had their own computer. Their knowledge regarding ergonomic computer use was at moderate level on average and significantly higher among those who owned a computer than who did not. On the other hand, it was found to be independent of gender, age and daily time spent on using computer.

Keywords: Computer, Ergonomic use, University students, Demographics, Survey

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Introduction

The use of information and computer technologies (ICT) has been increasing steadily in Turkey for the last 10 years. According to the latest data regularly collected by the Turkish Statistical Institution (TUIK), in 2023, the proportion of households with access to the Internet from home increased by 1.4 points compared to the previous year and reached 95.5% and the internet usage rate among individuals in the 16-74 age group was 87.1%, which was 85.0% in 2022 (TUIK, 2023). Individuals interact with these technologies for a significant

part of the day. There are different opinions and scientific research findings about the consequences of such an exposure and usage and indicating that these technologies can turn into threats or opportunities in terms of physical, cognitive and psychosocial health depending on how they are used (Akbulut, 2013).

The related literature suggests that especially long-term continuous and non-ergonomic usage (e.g., sitting and posture conditions) may lead to a number of health problems including musculoskeletal system disorders and vision and posture problems. For example, Kuzu et al. (2008) showed that physiological problems in a family increased as the time and frequency of Internet use increased and included eye fatigue/eye redness; back/neck pain, headache, joint/muscle pain, fatigue and insomnia. Bayrakcioglu (2018) examined ergonomic working conditions of 197 Turkish high school students who use computers and showed that 52% of the students felt pain, itching or stinging in their eyes and 39% felt pain in wrists, arms and back during long-term computer work. Some studies focused on office workers whose work primarily required using computers. For instance, Temiz Bektas (2020) examined ten Turkish office workers' equipments and related consequences based on their usage using ROSA (Rapid Office Strain Assessment) method and concluded that two workers were found highly at risk and suggested making or changing equipment and sub-components in accordance with ergonomics, reducing exposure times by increasing break time and focusing on ergonomics training. In his doctoral dissertation, Baydur (2011) revealed that training and risk assessment implemented using the participatory ergonomics method reduced the likelihood of musculoskeletal complaints in office workers using computers and improves protective behavior practices and work environment suitability. Using a descriptive survey study in a western city of Turkey, Ozvurmaz (2013) found that the neck and shoulder areas were most frequently affected in bank employees who work using computers.

Purpose of the Study

Studies in this issue indicate that long-term continuous and non-ergonomic usage may lead to a number of health problems. Therefore, it is crucial for students to learn and implement ergonomic usage principals. Perhaps, university students are the most at risk users as their access to computer technologies increase due to various technological facilities offered by universities as well as increased free time uncontrolled by parents or relatives. This study aims to explore university students' awareness level of ergonomic computer use.

Method

This study was designed with the survey model, one of the descriptive research methods based on the quantitative research paradigm. The survey model is a research approach that aims to describe a past or present situation within its own natural context (Mertens, 1999). The situation under investigation in the present study is the awareness level of Turkish university students and its relationship with some demographic characteristics. Using a convenience sampling method, the researchers recruited 144 students attending at a major southwestern university in Turkey, who were volunteer to participate in this research study. Data were collected through

paper-and-pencil questionnaire form. The form began asking questions about participants' personal information including gender and age as well as computer usage profiles such as computer ownership and time spent at computing on a day. It continued with items related to knowledge and skills for ergonomic principles of computer usage. These items were adapted from the related literature and previously-developed similar measurements. Participants were asked to rate the level of their agreement with these items on a 5-point Likert-scale where 1 indicates strongly disagree and 5 indicates strongly agree. The questionnaire was conducted in the 2018 Spring semester.

Results

Of the 144 participants, 62 (43%) were male and 82 (57%) were female students. Their age varied from 18 to 32 and the mean age was 21.67 years ($SD=2.43$). More than half (67%) of the students had their own computer whereas the remaining (33%) has no personal computer. They were asked to write how much time they spend at computing on a day and the answers ranged from zero to 11 hours with mean time of 2.41 hours ($SD=2.43$).

Descriptive statistics were calculated for the ergonomic computer usage items and the results are presented in Table 1 below. As far as the average scores are concerned, students agree with the statements like "I know the health problems that may occur as a result of computer misuse" ($Mean=3.65$, $SD=1.22$), "I know that using a computer in a dark environment may damage my eyes" ($Mean=3.33$, $SD=1.35$), "I know how to stand at the computer" ($Mean=3.22$, $SD=1.30$), "I adjust the computer and eye level appropriately" ($Mean=3.22$, $SD=1.25$), and "I take breaks at regular intervals while spending time in front of the computer" ($Mean=3.11$, $SD=1.39$). On the other hand, they seem to be undecided about the statements like "I take care to stand upright while sitting on a chair in front of the computer" ($Mean=2.92$, $SD=1.34$), "I know what ergonomic sitting is and I try to apply it" ($Mean=2.70$, $SD=1.40$), and "I exercise at regular intervals while using the computer" ($Mean=2.47$, $SD=1.33$).

Table 1. Participants' Awareness Level of Ergonomic Computer Usage

Item	Mean	SD
I know the health problems that may occur as a result of computer misuse	3.65	1.22
I know that using a computer in a dark environment may damage my eyes	3.33	1.35
I know how to stand at the computer	3.22	1.30
I adjust the computer and eye level appropriately	3.22	1.25
I take breaks at regular intervals while spending time in front of the computer	3.11	1.39
I take care to stand upright while sitting on a chair in front of the computer	2.92	1.34
I know what ergonomic sitting is and I try to apply it	2.70	1.40
I exercise at regular intervals while using the computer	2.47	1.33

The researchers conducted an exploratory factor analysis on these items to determine their factorial structure as well as to form a composite so that they could investigate whether the students' awareness level differed

according to demographic variables. The suitability of the data for factor analysis was evaluated before the principle component analysis. The Kaiser-Meyer-Okin value was .74, exceeding the recommended value of .60 and Bartlett's test of sphericity reached statistical significance (Chi-Square=190,47, df=28, $p<.01$), supporting the factorability of the correlation matrix (Pallant, 2007). An inspection of the screeplot (Figure 1) revealed a clear break after the first component, suggesting a one-factor solution explaining a total of 34% of the variance. All items were remained in the single factor as their absolute factor loadings values, which varied between .45 and .64, were greater than the common cutoff score of .30 in the literature. Based on the factor analysis findings, all items were summed to create a composite variable to represent students' overall awareness level of ergonomic computer usage (Mean=24.60, SD=6.11) and to use in the further analyses.

The researchers conducted an independent samples t-test (Table 2) to investigate whether students' awareness level differs according to gender. The results showed no significant differences [$t_{(142)}=-.38$, $p>.05$] in awareness level between male (Mean=24.82, SD=6.01) and female students (Mean=24.43, SD=6.22).

Table 2. Comparison of Ergonomic Computer Use Awareness by Gender

Gender	N	Mean	SD	t	p
Male	62	24.82	6.01	-.38	.70
Female	82	24.43	6.22		

The researchers conducted another independent samples t-test (Table 3) to investigate whether students' awareness level differs according to computer ownership. The results showed that [$t_{(142)}=3.54$, $p<.01$] those who owned a computer (Mean=25.80, SD=6.21) had more awareness that those without personal computer (Mean=22.11, SD=5.14).

Table 3. Comparison of Ergonomic Computer Use Awareness by Computer Ownership

Computer ownership	N	Mean	SD	t	p
Yes	97	25.80	6.21	3.54	.001
No	47	22.11	5.14		

Since age and time spent t computing were measured as a continuous variable, theirs relationship to students' awareness level were inspected using Pearson product-moment correlation coefficient. The results revealed that students awareness level of ergonomic computer use was not significantly associated with their age ($r=.02$, $p>.05$) and time spent at computing on a day ($r=.05$, $p>.05$).

Conclusion

In conclusion, this survey shows that participating university students' knowledge regarding ergonomic computer use is at moderate level on average. They are aware of most of the risks due to non-ergonomic usage

and have the knowledge of related principals of ergonomic usage. However, their knowledge about ergonomic sitting/stand positions as well as regular exercising is not adequate and thus calls for educational activities for improvement. Regarding demographic and computer profiles, students with their own computer have significantly more knowledge about ergonomic computer usage than those without personal computer. This is an expected finding because having a computer always ready to use can encourage individuals to learn more aspects of it including its negative consequences and thus try to use it more carefully. On the other hand, the awareness level is not related to gender, age and daily time spent on using computer. This suggests that students independent of their demographic characteristic consider the health issues germane to computer usage and take necessary precautions.

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